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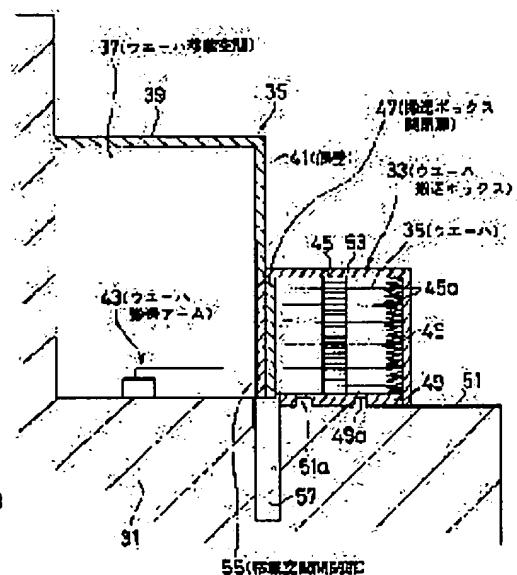
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## (54) WAFER TRANSFER APPARATUS

### (57)Abstract:

**PURPOSE:** To suppress the adhesion of particles to wafers in a wafer transfer space by a method wherein a transfer space opening/closing door is formed in the side wall of the wafer transfer space and a carrier box opening/closing door is provided at a position facing the transfer space opening/closing door.

**CONSTITUTION:** The transfer space opening/closing door 55 of a side wall 41 and the carrier box opening/closing door 47 of a wafer carrier box 33 are so provided as to be adjacent to each other and to face each other. In this state, the transfer space opening/closing door 55 and the carrier box opening/closing door 47 are opened and wafers 35 in the wafer carrier box 33 are taken out directly and transferred into an apparatus 31 by a wafer carrying arm 43 provided in the wafer transfer space 37. Therefore, a driving mechanism provided in the wafer



transfer space 37 can consist of the wafer carrying arm 43 only. As a result, dust sources in the wafer transfer space 37 can be reduced, so that the possibility of the adhesion of particles to the wafers 35 can be substantially reduced.

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## LEGAL STATUS

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**CLAIMS****[Claim(s)]**

[Claim 1] The wafer conveyance arm arranged in the wafer transfer space which isolates with a semi-conductor manufacture environment and is formed, While being arranged on the outside of the side attachment wall of said wafer transfer space, having the wafer conveyance box in which a wafer is held possible [ taking out ] by said wafer conveyance arm and forming a transfer space closing motion door in the wafer carrying-in location of said side attachment wall The wafer transfer equipment characterized by coming to form a conveyance box closing motion door in the location which counters said transfer space closing motion door of said wafer conveyance box.

[Claim 2] The wafer transfer equipment according to claim 1 characterized by having the guidance device in which turn said wafer conveyance box to the transfer space closing motion door of said side attachment wall, and it shows it to it.

[Claim 3] The wafer transfer equipment according to claim 1 or 2 characterized by having the fixed device which fixes said wafer conveyance box to said side attachment wall.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Industrial Application] Especially this invention relates to the wafer transfer equipment for carrying in the wafer in a wafer conveyance box in equipment with respect to semiconductor fabrication machines and equipment.

[0002]

[Description of the Prior Art] If in charge of manufacture of a semi-conductor, in order to prevent the fall of the yield of the device by adhesion of particle generally, the pure semi-conductor manufacture environment is needed.

[0003] And there is much what prepared interface space and what is indicated by JP,60-220945,A, JP,62-222625,A, etc. is known for semiconductor fabrication machines and equipment in recent years as such semiconductor fabrication machines and equipment, for example so that it may not be influenced of a circumference environment on the occasion of delivery of a wafer.

[0004] Drawing 5 shows this kind of semiconductor fabrication machines and equipment, and the equipments 11, such as an etching system, a sputtering system, and a CVD system, are arranged in order of the process at these semiconductor fabrication machines and equipment.

[0005] Moreover, the wafer transfer equipment 17 for carrying in the wafer which is held in the wafer carrier 15 in the wafer conveyance box 13 and which is not illustrated in equipment 11 is arranged in the 1 side upper part of equipment 11.

[0006] In these semiconductor fabrication machines and equipment, the wafer which the process of 1 ended is contained by the wafer carrier 15, and is carried by the following process with the wafer conveyance box 13. The wafer conveyance box 15 carried by the following process is installed above the wafer transfer space 19, and the wafer carrier 15 in the wafer conveyance box 13 is moved into the wafer transfer space 19, when the wafer carrier elevator 21 moves in the vertical direction.

[0007] The wafer carrier 15 moved into the wafer transfer space 19 is installed in the loader section of equipment 11 by the wafer carrier transfer arm 23, and the wafer in the wafer carrier 15 is conveyed in equipment 11 by the wafer conveyance arm 25, and it is processed.

[0008]

[Problem(s) to be Solved by the Invention] However, in such a conventional wafer transfer equipment 17, since the wafer carrier elevator 21 for going up and down the wafer carrier 15 in the wafer transfer space 19 is arranged, the dust from the wafer carrier elevator 21 is scattered in the wafer transfer space 19, and there is a possibility that the wafer transfer space 19 which needs to maintain clarification space may be polluted.

[0009] Moreover, since the wafer carrier 15 was carried in in the wafer transfer space 19, there was a problem that the particle which adhered to the wafer carrier 15 in the wafer transfer space 19 will be carried in in the wafer conveyance box 13.

[0010] That is, in the wafer transfer equipment 17 mentioned above, in spite of having isolated the wafer transfer space 19 from the bad circumference environment of cleanliness and having considered as clarification space, particle adhered to the wafer in the wafer transfer space 19, consequently there was a problem that the yield and dependability of a semiconductor device fell.

[0011] This invention was made in order to solve this conventional problem, and it tends to offer the wafer transfer equipment which can reduce more sharply than before that particle adheres to a wafer.

[0012]

[Means for Solving the Problem] The wafer conveyance arm arranged in the wafer transfer space which isolates the wafer transfer equipment in connection with this invention with a semi-conductor manufacture environment, and is

formed, While being arranged on the outside of the side attachment wall of said wafer transfer space, having the wafer conveyance box in which a wafer is held possible [ taking out ] by said wafer conveyance arm and forming a transfer space closing motion door in the wafer carrying-in location of said side attachment wall It comes to form a conveyance box closing motion door in the location which counters said transfer space closing motion door of said wafer conveyance box.

[0013]

[Function] With the wafer transfer equipment of this invention, where contiguity arrangement of the transfer space closing motion door of a side attachment wall and the conveyance box closing motion door of a wafer conveyance box is carried out face to face, a transfer space closing motion door and a conveyance box closing motion door are opened, and the wafer in a wafer conveyance box is taken out direct picking by the wafer conveyance arm arranged in wafer transfer space, and is transferred into equipment.

[0014]

[Example] Hereafter, the example which shows the detail of this invention to a drawing is explained. Drawing 1 shows the semiconductor fabrication machines and equipment with which the 1st example of the wafer transfer equipment of this invention is arranged, and the equipments 31, such as an etching system, a sputtering system, and a CVD system, are arranged in order of the process at these semiconductor fabrication machines and equipment.

[0015] And the wafer transfer equipment 35 for carrying in the wafer 35 in the wafer conveyance box 33 in equipment 31 is arranged in the 1 side upper part of equipment 31. In drawing, the sign 37 shows the wafer transfer space which isolates with a semi-conductor manufacture environment and is formed.

[0016] This wafer transfer space 37 is formed with the head-lining wall 39 and the side attachment wall 41. The wafer conveyance arm 43 is arranged in the wafer transfer space 37.

[0017] And the wafer conveyance box 33 where a wafer 35 is held in the outside of the side attachment wall 41 of the wafer transfer space 37 is arranged. This wafer conveyance box 33 is a container used in order to convey a wafer 35 between the equipment 31 mentioned above.

[0018] Two or more wafer supporter material 45 is being fixed to the inside of the wafer conveyance box 33. Predetermined spacing is kept in the vertical direction and two or more concave 45a in which the edge of a wafer 35 is inserted is formed in the wafer supporter material 45, such as this.

[0019] In addition, in this example, spacing of the vertical direction of concave 45a is set up so that it may become a minimum interval at spacing in which the ejection of the wafer 35 by the wafer conveyance arm 43 is possible.

[0020] The conveyance box closing motion door 47 which moves in the vertical direction, and opens and closes the wafer conveyance box 33 is arranged at the side-attachment-wall 41 side of the wafer conveyance box 33.

Predetermined spacing is set in the bottom plate 49 of the wafer conveyance box 33, concave 49a is formed in it, and fitting of the projection 51a formed in the top plate 51 of equipment 31 is carried out to this concave 49a.

[0021] In addition, when projection 51a is fitted into concave 49a of the wafer conveyance box 33, let the location of projection 51a be the location where the tip of the crown plate 53 of the wafer conveyance box 33 contacts a side attachment wall 41.

[0022] The transfer space closing motion door 55 moved in the vertical direction is arranged in the wafer carrying-in location of a side attachment wall 41. And the door stowage 57 for holding the doors 47 and 55, such as this, at the time of migration in the lower part of the transfer space closing motion door 55 and the conveyance box closing motion door 47 is formed in the top plate 51 of equipment 31.

[0023] In the wafer transfer equipment mentioned above, the wafer 35 which the process of 1 ended is in the condition which kept predetermined spacing in the wafer supporter material 45 in the wafer conveyance box 33, and was supported, and is carried by the following process with the wafer conveyance box 33.

[0024] The wafer conveyance box 33 carried by the following process is arranged so that the conveyance box closing motion door 47 may counter the transfer space closing motion door 55 of a side attachment wall 41, and the tip of the crown plate 53 of the wafer conveyance box 33 is contacted by the side attachment wall 41 by fitting into projection 51a formed in the top plate 51 of equipment 31 in concave 49a of the bottom plate 49 of the wafer conveyance box 33.

[0025] Then, in this condition, the transfer space closing motion door 55 and the conveyance box closing motion door 47 are opened, and the wafer 35 in the wafer conveyance box 33 is taken out by the wafer conveyance arm 43 arranged in the wafer transfer space 37, and it is transferred into equipment 31.

[0026] In the wafer transfer equipment which carried out the deer and was constituted as mentioned above After the transfer space closing motion door 55 of a side attachment wall 41 and the conveyance box closing motion door 47 of the wafer conveyance box 33 countered and contiguity arrangement has been carried out By the wafer conveyance arm 43 which the transfer space closing motion door 55 and the conveyance box closing motion door 47 are opened, and is

arranged in the wafer transfer space 37. The wafer 35 in the wafer conveyance box 33 direct picking Since it is taken out and transferred into equipment 31, It can become possible to use only as the wafer conveyance arm 43 the drive arranged in the wafer transfer space 37, consequently the source of raising dust in the wafer transfer space 37 can be decreased, and it can reduce more sharply than before that particle adheres to a wafer 35.

[0027] Moreover, in the wafer transfer equipment mentioned above, since the direct wafer 35 was held in the wafer conveyance box 33, it becomes unnecessary to use a wafer carrier like before, and the drag-in of the particle into the wafer conveyance box 33 by the wafer carrier is lost and the capacity of the wafer conveyance box 33 becomes small, adhesion of particle to a wafer 35 can be reduced more.

[0028] Furthermore, in the wafer transfer equipment mentioned above, since it becomes unnecessary to transfer a wafer carrier, conventionally, contact in the wafer carrier and the edge section of a wafer 35 which had been produced by vibration to the perpendicular direction of a wafer carrier is lost, and it becomes possible to prevent that a wafer 35 is damaged by contact.

[0029] Drawing 2 shows the 2nd example of this invention, and the fan 59 and air filter 61 for supplying clarification air in the wafer transfer space 37 are arranged in this example at the head-lining section of the wafer transfer space 37.

[0030] Moreover, the guidance device 63 in which turn the wafer conveyance box 33 to the transfer space closing motion door 55 of a side attachment wall 41, and it shows it to it is formed in the top plate 51 of equipment 31. This guidance device 63 has the projection 65 which moves to the top plate 51 of equipment 31 towards the transfer space closing motion door 55 of a side attachment wall 41.

[0031] On the other hand, the concave 67 which fits into projection 65 is formed in the base 49 of the wafer conveyance box 33. Furthermore, in this example, the fixed device 69 for fixing the wafer conveyance box 33 to a side attachment wall 41 is established.

[0032] This fixed device 69 has the stationary plate 71 arranged at the methods of three of the transfer space closing motion door 55 formed in a side attachment wall 41, as shown in drawing 3. The stationary plates 71, such as this, are constituted free [ migration ] towards the transfer space closing motion door 55 side.

[0033] On the other hand, the flange 73 for immobilization which projects towards the method of outside into the part except a bottom plate 49 is formed in the conveyance box closing motion door 47 side of the wafer conveyance box 33. Therefore, when projection 65 moves towards the transfer space closing motion door 55, the conveyance box closing motion door 47 adjoins the transfer space closing motion door 55.

[0034] In this condition of having adjoined, as shown in drawing 4, press immobilization of the flange 73 for immobilization is firmly carried out at a side attachment wall 41 by moving a stationary plate 71 to the transfer space closing motion door 55 side, and holding the flange 73 for immobilization of the wafer conveyance box 33 in the crevice 75 formed between stop projection 71a of a stationary plate 71, and a side attachment wall 41.

[0035] In the wafer transfer equipment mentioned above, the wafer 35 which the process of 1 ended is in the condition which kept predetermined spacing in the wafer supporter material 45 in the wafer conveyance box 33, and was supported, and is carried by the following process with the wafer conveyance box 33.

[0036] As the conveyance box closing motion door 47 counters the transfer space closing motion door 55 of a side attachment wall 41, fitting of the concave 67 of a bottom plate 49 is carried out to the projection 65 formed in the top plate 51 of equipment 31, the wafer conveyance box 33 carried by the following process is in this condition, and the wafer conveyance box 33 is moved towards the transfer space closing motion door 55.

[0037] Then, in the condition that the conveyance box closing motion door 47 adjoined to the transfer space closing motion door 55 by migration, as shown to drawing 4, a stationary plate 71 is moved to the transfer space closing motion door 55 side, the flange 73 for immobilization of the wafer conveyance box 33 is held in the crevice 75 formed between stop projection 71a of a stationary plate 71, and a side attachment wall 41, and press immobilization of the flange 73 for immobilization is carried out firmly at a side attachment wall 41.

[0038] Then, in this condition, like the 1st example, the transfer space closing motion door 55 and the conveyance box closing motion door 47 are opened, and the wafer 35 in the wafer conveyance box 33 is taken out by the wafer conveyance arm 43 arranged in the wafer transfer space 37, and it is transferred into equipment 31.

[0039] Also in the wafer transfer equipment of this example, although the almost same effectiveness as the 1st example can be acquired, since the guidance device 63 in which turned the wafer conveyance box 33 to the transfer space closing motion door 55 of a side attachment wall 41, and it showed it to it was established, it becomes possible to turn the wafer conveyance box 33 to a side attachment wall 41, and to press it, and it can improve adhesion in this example.

[0040] Consequently, it becomes possible for the airtightness of the wafer transfer space 37 to improve, and for invasion of the particle from the outside to the wafer transfer space 37 to be prevented, and to make full the inside of the wafer transfer space 37 with inert gas, and further, since airtightness improves, it becomes possible to circulate through

clarification air efficiently.

[0041] Moreover, in this example, since the fixed device 69 for fixing the wafer conveyance box 33 to a side attachment wall 41 was established, the airtightness of the wafer conveyance box 33 and the wafer transfer space 37 can be improved more.

[0042] Furthermore, in this example, since the fan 59 and air filter 61 for supplying clarification air in the wafer transfer space 37 have been arranged, when clarification air can always be supplied in the wafer transfer space 37 and particle occurs in the wafer transfer space 37, it becomes possible to remove particle to the downstream quickly, and can prevent more effectively that particle adheres to a wafer 35.

[0043] In addition, although the example described above explained the example which established the door stowage 57 in the top plate 51 of equipment 31, this invention is not limited to this example, and may thicken width of face of a side attachment wall 41, for example, of course, you may prepare in a side attachment wall 41.

[0044] Moreover, when the device for operating the conveyance box closing motion door 47 and the transfer space closing motion door 55 exists in the door stowage 57 in the 2nd example mentioned above, it is desirable to perform local ventilation in the door stowage 57 so that particle may not disperse in the wafer transfer space 37 side.

[0045] Furthermore, although the example described above explained the example which supplied clarification air in the wafer transfer space 37 with the fan 59 and the air filter 61, as for this invention, it is needless to say that it is not limited to this example, and a fan and an air filter are prepared in the wafer transfer space 37, for example, you may make it circulate clarification air or inert gas in the wafer transfer space 37.

[0046]

[Effect of the Invention] As stated above, in the wafer transfer equipment of this invention After the transfer space closing motion door of a side attachment wall and the conveyance box closing motion door of a wafer conveyance box countered and contiguity arrangement has been carried out The wafer in a wafer conveyance box direct picking by the wafer conveyance arm which a transfer space closing motion door and a conveyance box closing motion door are opened, and is arranged in wafer transfer space Since it is taken out and transferred into equipment, It becomes possible to use only as a wafer conveyance arm the drive arranged in wafer transfer space. Consequently, the source of raising dust in wafer transfer space can be decreased, and it can reduce more sharply than before that particle adheres to a wafer, consequently there is an advantage that the yield and dependability of a semiconductor device can be improved.

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**TECHNICAL FIELD**

[Industrial Application] Especially this invention relates to the wafer transfer equipment for carrying in the wafer in a wafer conveyance box in equipment with respect to semiconductor fabrication machines and equipment.

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PRIOR ART

[Description of the Prior Art] If in charge of manufacture of a semi-conductor, in order to prevent the fall of the yield of the device by adhesion of particle generally, the pure semi-conductor manufacture environment is needed.

[0003] And there is much what prepared interface space and what is indicated by JP,60-220945,A, JP,62-222625,A, etc. is known for semiconductor fabrication machines and equipment in recent years as such semiconductor fabrication machines and equipment, for example so that it may not be influenced of a circumference environment on the occasion of delivery of a wafer.

[0004] Drawing 5 shows this kind of semiconductor fabrication machines and equipment, and the equipments 11, such as an etching system, a sputtering system, and a CVD system, are arranged in order of the process at these semiconductor fabrication machines and equipment.

[0005] Moreover, the wafer transfer equipment 17 for carrying in the wafer which is held in the wafer carrier 15 in the wafer conveyance box 13 and which is not illustrated in equipment 11 is arranged in the 1 side upper part of equipment 11.

[0006] In these semiconductor fabrication machines and equipment, the wafer which the process of 1 ended is contained by the wafer carrier 15, and is carried by the following process with the wafer conveyance box 13. The wafer conveyance box 15 carried by the following process is installed above the wafer transfer space 19, and the wafer carrier 15 in the wafer conveyance box 13 is moved into the wafer transfer space 19, when the wafer carrier elevator 21 moves in the vertical direction.

[0007] The wafer carrier 15 moved into the wafer transfer space 19 is installed in the loader section of equipment 11 by the wafer carrier transfer arm 23, and the wafer in the wafer carrier 15 is conveyed in equipment 11 by the wafer conveyance arm 25, and it is processed.

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**EFFECT OF THE INVENTION**

[Effect of the Invention] As stated above, in the wafer transfer equipment of this invention After the transfer space closing motion door of a side attachment wall and the conveyance box closing motion door of a wafer conveyance box countered and contiguity arrangement has been carried out The wafer in a wafer conveyance box direct picking by the wafer conveyance arm which a transfer space closing motion door and a conveyance box closing motion door are opened, and is arranged in wafer transfer space Since it is taken out and transferred into equipment, It becomes possible to use only as a wafer conveyance arm the drive arranged in wafer transfer space. Consequently, the source of raising dust in wafer transfer space can be decreased, and it can reduce more sharply than before that particle adheres to a wafer, consequently there is an advantage that the yield and dependability of a semiconductor device can be improved.

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**TECHNICAL PROBLEM**

[Problem(s) to be Solved by the Invention] However, in such a conventional wafer transfer equipment 17, since the wafer carrier elevator 21 for going up and down the wafer carrier 15 in the wafer transfer space 19 is arranged, the dust from the wafer carrier elevator 21 is scattered in the wafer transfer space 19, and there is a possibility that the wafer transfer space 19 which needs to maintain clarification space may be polluted.

[0009] Moreover, since the wafer carrier 15 was carried in in the wafer transfer space 19, there was a problem that the particle which adhered to the wafer carrier 15 in the wafer transfer space 19 will be carried in in the wafer conveyance box 13.

[0010] That is, in the wafer transfer equipment 17 mentioned above, in spite of having isolated the wafer transfer space 19 from the bad circumference environment of cleanliness and having considered as clarification space, particle adhered to the wafer in the wafer transfer space 19, consequently there was a problem that the yield and dependability of a semiconductor device fell.

[0011] This invention was made in order to solve this conventional problem, and it tends to offer the wafer transfer equipment which can reduce more sharply than before that particle adheres to a wafer.

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**MEANS**

[Means for Solving the Problem] The wafer conveyance arm arranged in the wafer transfer space which isolates the wafer transfer equipment in connection with this invention with a semi-conductor manufacture environment, and is formed, While being arranged on the outside of the side attachment wall of said wafer transfer space, having the wafer conveyance box in which a wafer is held possible [ taking out ] by said wafer conveyance arm and forming a transfer space closing motion door in the wafer carrying-in location of said side attachment wall It comes to form a conveyance box closing motion door in the location which counters said transfer space closing motion door of said wafer conveyance box.

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## OPERATION

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[Function] With the wafer transfer equipment of this invention, where contiguity arrangement of the transfer space closing motion door of a side attachment wall and the conveyance box closing motion door of a wafer conveyance box is carried out face to face, a transfer space closing motion door and a conveyance box closing motion door are opened, and the wafer in a wafer conveyance box is taken out direct picking by the wafer conveyance arm arranged in wafer transfer space, and is transferred into equipment.

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## EXAMPLE

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[Example] Hereafter, the example which shows the detail of this invention to a drawing is explained. Drawing 1 shows the semiconductor fabrication machines and equipment with which the 1st example of the wafer transfer equipment of this invention is arranged, and the equipments 31, such as an etching system, a sputtering system, and a CVD system, are arranged in order of the process at these semiconductor fabrication machines and equipment.

[0015] And the wafer transfer equipment 35 for carrying in the wafer 35 in the wafer conveyance box 33 in equipment 31 is arranged in the 1 side upper part of equipment 31. In drawing, the sign 37 shows the wafer transfer space which isolates with a semi-conductor manufacture environment and is formed.

[0016] This wafer transfer space 37 is formed with the head-lining wall 39 and the side attachment wall 41. The wafer conveyance arm 43 is arranged in the wafer transfer space 37.

[0017] And the wafer conveyance box 33 where a wafer 35 is held in the outside of the side attachment wall 41 of the wafer transfer space 37 is arranged. This wafer conveyance box 33 is a container used in order to convey a wafer 35 between the equipment 31 mentioned above.

[0018] Two or more wafer supporter material 45 is being fixed to the inside of the wafer conveyance box 33. Predetermined spacing is kept in the vertical direction and two or more concave 45a in which the edge of a wafer 35 is inserted is formed in the wafer supporter material 45, such as this.

[0019] In addition, in this example, spacing of the vertical direction of concave 45a is set up so that it may become a minimum interval at spacing in which the ejection of the wafer 35 by the wafer conveyance arm 43 is possible.

[0020] The conveyance box closing motion door 47 which moves in the vertical direction, and opens and closes the wafer conveyance box 33 is arranged at the side-attachment-wall 41 side of the wafer conveyance box 33.

Predetermined spacing is set in the bottom plate 49 of the wafer conveyance box 33, concave 49a is formed in it, and fitting of the projection 51a formed in the top plate 51 of equipment 31 is carried out to this concave 49a.

[0021] In addition, when projection 51a is fitted into concave 49a of the wafer conveyance box 33, let the location of projection 51a be the location where the tip of the crown plate 53 of the wafer conveyance box 33 contacts a side attachment wall 41.

[0022] The transfer space closing motion door 55 moved in the vertical direction is arranged in the wafer carrying-in location of a side attachment wall 41. And the door stowage 57 for holding the doors 47 and 55, such as this, at the time of migration in the lower part of the transfer space closing motion door 55 and the conveyance box closing motion door 47 is formed in the top plate 51 of equipment 31.

[0023] In the wafer transfer equipment mentioned above, the wafer 35 which the process of 1 ended is in the condition which kept predetermined spacing in the wafer supporter material 45 in the wafer conveyance box 33, and was supported, and is carried by the following process with the wafer conveyance box 33.

[0024] The wafer conveyance box 33 carried by the following process is arranged so that the conveyance box closing motion door 47 may counter the transfer space closing motion door 55 of a side attachment wall 41, and the tip of the crown plate 53 of the wafer conveyance box 33 is contacted by the side attachment wall 41 by fitting into projection 51a formed in the top plate 51 of equipment 31 in concave 49a of the bottom plate 49 of the wafer conveyance box 33.

[0025] Then, in this condition, the transfer space closing motion door 55 and the conveyance box closing motion door 47 are opened, and the wafer 35 in the wafer conveyance box 33 is taken out by the wafer conveyance arm 43 arranged in the wafer transfer space 37, and it is transferred into equipment 31.

[0026] In the wafer transfer equipment which carried out the deer and was constituted as mentioned above After the transfer space closing motion door 55 of a side attachment wall 41 and the conveyance box closing motion door 47 of the wafer conveyance box 33 countered and contiguity arrangement has been carried out By the wafer conveyance arm 43 which the transfer space closing motion door 55 and the conveyance box closing motion door 47 are opened, and is

arranged in the wafer transfer space 37. The wafer 35 in the wafer conveyance box 33 direct picking Since it is taken out and transferred into equipment 31, It can become possible to use only as the wafer conveyance arm 43 the drive arranged in the wafer transfer space 37, consequently the source of raising dust in the wafer transfer space 37 can be decreased, and it can reduce more sharply than before that particle adheres to a wafer 35.

[0027] Moreover, in the wafer transfer equipment mentioned above, since the direct wafer 35 was held in the wafer conveyance box 33, it becomes unnecessary to use a wafer carrier like before, and the drag-in of the particle into the wafer conveyance box 33 by the wafer carrier is lost and the capacity of the wafer conveyance box 33 becomes small, adhesion of particle to a wafer 35 can be reduced more.

[0028] Furthermore, in the wafer transfer equipment mentioned above, since it becomes unnecessary to transfer a wafer carrier, conventionally, contact in the wafer carrier and the edge section of a wafer 35 which had been produced by vibration to the perpendicular direction of a wafer carrier is lost, and it becomes possible to prevent that a wafer 35 is damaged by contact.

[0029] Drawing 2 shows the 2nd example of this invention, and the fan 59 and air filter 61 for supplying clarification air in the wafer transfer space 37 are arranged in this example at the head-lining section of the wafer transfer space 37.

[0030] Moreover, the guidance device 63 in which turn the wafer conveyance box 33 to the transfer space closing motion door 55 of a side attachment wall 41, and it shows it to it is formed in the top plate 51 of equipment 31. This guidance device 63 has the projection 65 which moves to the top plate 51 of equipment 31 towards the transfer space closing motion door 55 of a side attachment wall 41.

[0031] On the other hand, the concave 67 which fits into projection 65 is formed in the base 49 of the wafer conveyance box 33. Furthermore, in this example, the fixed device 69 for fixing the wafer conveyance box 33 to a side attachment wall 41 is established.

[0032] This fixed device 69 has the stationary plate 71 arranged at the methods of three of the transfer space closing motion door 55 formed in a side attachment wall 41, as shown in drawing 3. The stationary plates 71, such as this, are constituted free [ migration ] towards the transfer space closing motion door 55 side.

[0033] On the other hand, the flange 73 for immobilization which projects towards the method of outside into the part except a bottom plate 49 is formed in the conveyance box closing motion door 47 side of the wafer conveyance box 33. Therefore, when projection 65 moves towards the transfer space closing motion door 55, the conveyance box closing motion door 47 adjoins the transfer space closing motion door 55.

[0034] In this condition of having adjoined, as shown in drawing 4, press immobilization of the flange 73 for immobilization is firmly carried out at a side attachment wall 41 by moving a stationary plate 71 to the transfer space closing motion door 55 side, and holding the flange 73 for immobilization of the wafer conveyance box 33 in the crevice 75 formed between stop projection 71a of a stationary plate 71, and a side attachment wall 41.

[0035] In the wafer transfer equipment mentioned above, the wafer 35 which the process of 1 ended is in the condition which kept predetermined spacing in the wafer supporter material 45 in the wafer conveyance box 33, and was supported, and is carried by the following process with the wafer conveyance box 33.

[0036] As the conveyance box closing motion door 47 counters the transfer space closing motion door 55 of a side attachment wall 41, fitting of the concave 67 of a bottom plate 49 is carried out to the projection 65 formed in the top plate 51 of equipment 31, the wafer conveyance box 33 carried by the following process is in this condition, and the wafer conveyance box 33 is moved towards the transfer space closing motion door 55.

[0037] Then, in the condition that the conveyance box closing motion door 47 adjoined to the transfer space closing motion door 55 by migration, as shown to drawing 4, a stationary plate 71 is moved to the transfer space closing motion door 55 side, the flange 73 for immobilization of the wafer conveyance box 33 is held in the crevice 75 formed between stop projection 71a of a stationary plate 71, and a side attachment wall 41, and press immobilization of the flange 73 for immobilization is carried out firmly at a side attachment wall 41.

[0038] Then, in this condition, like the 1st example, the transfer space closing motion door 55 and the conveyance box closing motion door 47 are opened, and the wafer 35 in the wafer conveyance box 33 is taken out by the wafer conveyance arm 43 arranged in the wafer transfer space 37, and it is transferred into equipment 31.

[0039] Also in the wafer transfer equipment of this example, although the almost same effectiveness as the 1st example can be acquired, since the guidance device 63 in which turned the wafer conveyance box 33 to the transfer space closing motion door 55 of a side attachment wall 41, and it showed it to it was established, it becomes possible to turn the wafer conveyance box 33 to a side attachment wall 41, and to press it, and it can improve adhesion in this example.

[0040] Consequently, it becomes possible for the airtightness of the wafer transfer space 37 to improve, and for invasion of the particle from the outside to the wafer transfer space 37 to be prevented, and to make full the inside of the wafer transfer space 37 with inert gas, and further, since airtightness improves, it becomes possible to circulate through

clarification air efficiently.

[0041] Moreover, in this example, since the fixed device 69 for fixing the wafer conveyance box 33 to a side attachment wall 41 was established, the airtightness of the wafer conveyance box 33 and the wafer transfer space 37 can be improved more.

[0042] Furthermore, in this example, since the fan 59 and air filter 61 for supplying clarification air in the wafer transfer space 37 have been arranged, when clarification air can always be supplied in the wafer transfer space 37 and particle occurs in the wafer transfer space 37, it becomes possible to remove particle to the downstream quickly, and can prevent more effectively that particle adheres to a wafer 35.

[0043] In addition, although the example described above explained the example which established the door stowage 57 in the top plate 51 of equipment 31, this invention is not limited to this example, and may thicken width of face of a side attachment wall 41, for example, of course, you may prepare in a side attachment wall 41.

[0044] Moreover, when the device for operating the conveyance box closing motion door 47 and the transfer space closing motion door 55 exists in the door stowage 57 in the 2nd example mentioned above, it is desirable to perform local ventilation in the door stowage 57 so that particle may not disperse in the wafer transfer space 37 side.

[0045] Furthermore, although the example described above explained the example which supplied clarification air in the wafer transfer space 37 with the fan 59 and the air filter 61, as for this invention, it is needless to say that it is not limited to this example, and a fan and an air filter are prepared in the wafer transfer space 37, for example, you may make it circulate clarification air or inert gas in the wafer transfer space 37.

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[Translation done.]

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## DESCRIPTION OF DRAWINGS

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**[Brief Description of the Drawings]**

[Drawing 1] It is the sectional view showing the 1st example of the wafer transfer equipment of this invention.

[Drawing 2] It is the sectional view showing the 2nd example of the wafer transfer equipment of this invention.

[Drawing 3] It is the sectional view which meets the III-III line of drawing 2.

[Drawing 4] It is drawing showing the condition when fixing the flange for immobilization by the stationary plate in drawing 3.

[Drawing 5] It is the sectional view showing the conventional wafer transfer equipment.

**[Description of Notations]**

33 Wafer Conveyance Box

35 Wafer

37 Wafer Transfer Space

41 Side Attachment Wall

43 Wafer Conveyance Arm

47 Conveyance Box Closing Motion Door

55 Transfer Space Closing Motion Door

63 Guidance Device

69 Fixed Device

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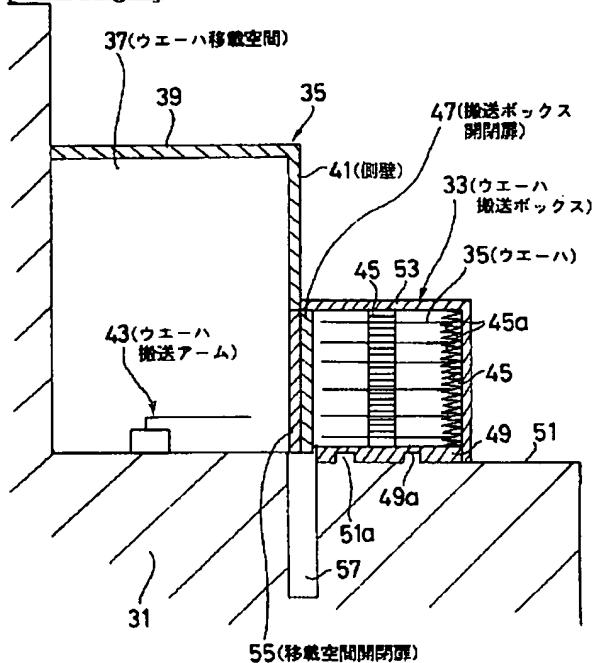
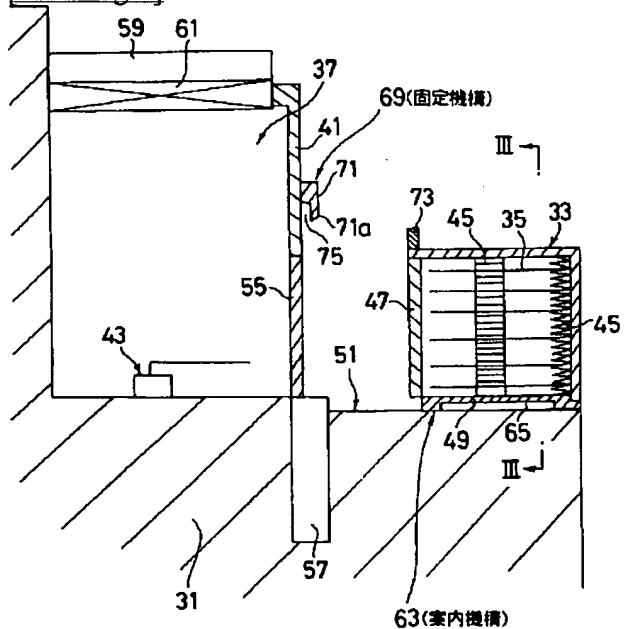
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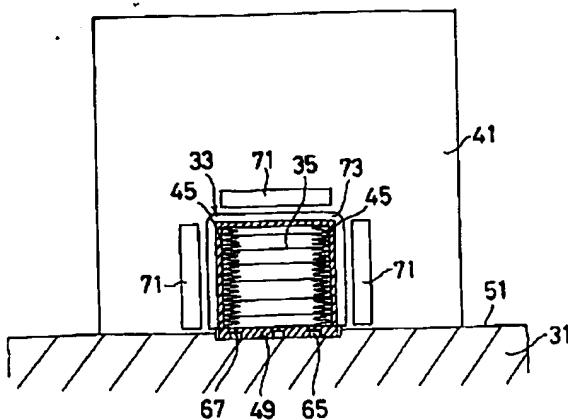
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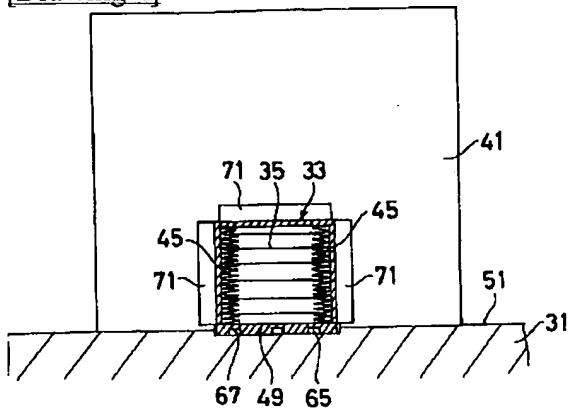
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## DRAWINGS

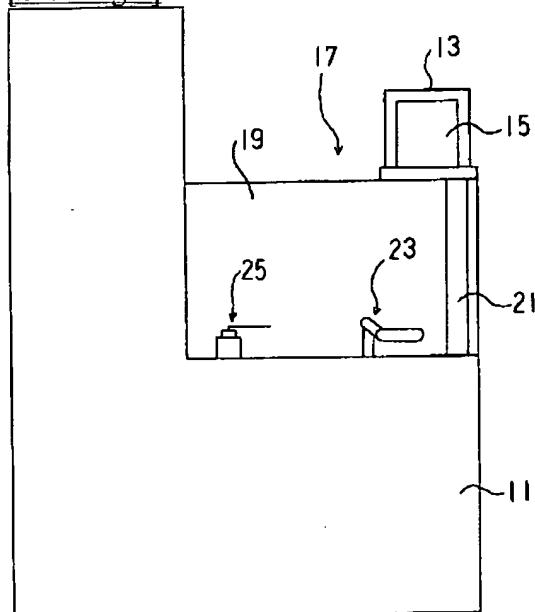
[Drawing 1][Drawing 2][Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]